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(54) IMPROVEMENTS IN OR RELATING TO A ROLLER ASSEMBLY

(71) We, VEREINIGTE ÖSTERREICHISCHE EISEN- UND STAHLWERKE—ALPINE MONTAN AKTIENGESELLSCHAFT, a company organized under the laws of Austria, residing at Vienna, Werksgelände 4010 Linz, Austria, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a continuous casting plant having a strand guide comprising rollers having distributed over their length a number of bearing zones received in bearing housings supported by a stationary supporting construction.

In modern continuous casting plants, in particular in casting plants for slabs, the strand is cast at high speed, and as a result has a thin strand skin immediately upon leaving the mould, which strand skin must be carefully supported by supporting rollers arranged closely behind one another. In order to be able to arrange the axes of the supporting rollers particularly closely behind one another to prevent pronounced bulging of the strand skin, supporting rollers having as small a diameter as possible are used. An undue bending of these relatively long, thin rollers is prevented by a number of bearing zones which are distributed over the length of each roller.

The installation of this multi-bearing roller into the strand guide is a problem, in particular when individual rollers have to be installed into the strand guide to replace damaged rollers. Hitherto these rollers have been installed into the strand guide according to two different methods. Either the bearing housing lower parts have been mounted in the strand guide stand, and then the rollers have been inserted therein and fixed with the bearing caps, or the rollers have been inserted in the bearing housings at first and then installed in the strand guide together with the bearing housings, whereupon the bearing housings have been fixed on the strand guide stand. Since, however, the bearings are also usually worn and have to be exchanged, the latter described installation method has been preferred, since with this method the period of standstill of the continuous casting plant necessary for exchanging the rollers and bearings can be kept much shorter than with the first described method. Difficulties arise, however, insofar as it is necessary to arrange for all the bearing housings of a roller to be freely rotated around the roller axis into the position necessary for an installation. Thus, shortly before inserting the roller into the strand guide, it is necessary to rotate the bearing housings into a position, in which the bearing faces of the bearing housings are directed towards the bearing places in the strand guide stand and maintain them in this position during the installation. This procedure is especially difficult when very wide rollers are used having a correspondingly large number of intermediate bearings, as well as when rollers are used that have to be inserted into the roller path supporting the upper side of the strand. In order to have access to the inwardly arranged bearing zones, it used to be necessary to separate the two roller paths supporting the strand, i.e. to dismantle the strand guide stand.

The invention aims at preventing these disadvantages and difficulties and its main object is to create a strand guide of the above defined kind, in which all the bearing housings of a roller can be brought into and kept in the position necessary for an installation by means of the two bearing housings arranged at the ends of the roller, so that manipulations at the inwardly arranged bearing housings, which are difficult to get at, are no longer necessary during installation.

According to the invention this object is achieved in that the bearing housings of a roller are interconnected by connecting means extending parallel to the roller axis for preventing relative rotation of the bearing housings around the roller axis.

A particularly advantageous embodiment of the invention is characterised in that the

bearing housings are interconnected by pipe conduits acting in addition for supplying the coolant and/or lubricant. Thus, when cooled or lubricated rollers are used, it is unnecessary to connect and disconnect the coolant or lubricant conduits with each individual bearing housing of a roller during installation and removal thereof. The roller and its bearing housings and coolant or lubricant conduits constitute an integral construction unit stored in assembled condition and installed in the strand guide stand when needed, thus providing a substantial time saving relative to other constructions.

A further embodiment of the invention that is especially well suited for supplying the bearing zones of a roller with lubricant, consists in that a separate pipe conduit is connected to each bearing housing, the pipe conduits of the bearing housings located inwardly along the length of the roller passing to the outside through bores in the outer bearing housings.

If required, the pipe conduits may extend to only one of the roller ends.

One embodiment which is especially advantageously used when a roller is to be provided with a closed coolant circuit, consists in that adjacent bearing housings of a roller are connected by one pipe conduit each and one or both of the outer bearing housings is or are provided with a pipe conduit leading to the outside which communicates with fluid supply means and the pipe conduits are interconnected.

Furthermore, in order to save time during a roller exchange, the ends of the pipe conduits which extend to the outside are advantageously connectable to a lubricant or coolant supply conduit, by means of a rapidly-releasable connection.

These and further features of the invention shall now be described in more detail by way of example only and with reference to the accompanying drawings, in which:

Fig. 1 shows a schematically illustrated, front view, and

Fig. 2 is a pertaining horizontal plan view, of a roller according to one embodiment of the invention supported by a plurality of bearings in a strand guide stand;

Fig. 3 is a view analogous to Fig. 1 on a larger scale and partly in section,

Fig. 4 is a view of a section along line IV—IV of Fig. 1 also on a larger scale,

Figs. 5 and 6 are views analogous to Figs. 1 and 2 of another embodiment of the invention,

Fig. 7 is a view according to Fig. 5 on a larger scale and partly in section, and

Fig. 8 is a view of a section along line VIII—VIII of Fig. 5, also on a larger scale.

The roller is denoted with 1, and has distributed over its length a number of bearing zones comprising bearing pins 2 and 2^1 mounted in bearing housings 3 and 3^1, the two bearing pins and bearing housings arranged at the ends of the roller being denoted with 2^1 and 3^1, respectively. The bearing housings 3 and 3^1 are supported via bearing supports 4 on carriers 5 which form part of a stationary strand guide stand. Pipe conduits 6, 6^1 arranged parallel to the axis of the roller 1 serve for supplying lubricant in the direction of the arrow to the individual bearing zones of the roller 1, the pipe conduits 6^1 supplying the outer bearing pins 2^1 and the pipe conduits 6 supplying the inwardly arranged bearing pins 2 with lubricant. The pipe conduits 6 are guided outside through bores 7 of the bearing housings 3^1 arranged at the ends of the roller, and bearing housings 3 and 3^1 are each secured against mutual rotation around the roller axis by these pipe conduits. Thus when a roller is inserted into the strand guide stand, only the outwardly arranged bearings housings 3^1 need be turned into the correct position, the inwardly arranged bearing housings 3 being turned together with and by the pipe conduits 6. Thus manipulations at the inwardly arranged bearing housings 3 can be omitted. Rapidly-releasable connections 8 at the pipe conduits contribute to an even faster roller exchange.

All the pipe conduits 6, 6^1 can also be guided to one end of the roller only, for even easier handling of the roller, and can be connected at this end by a central connection, so that for a roller exchange only one lubricant connection need be disconnected or connected, respectively. It is a further advantage that the lubricant supply conduits mounted in the stand need only be provided near one of the roller ends.

Figs. 5 to 8 are an embodiment of the strand guide according to the invention as it is advantageously applied when cooling of the bearing zones with a closed coolant circuit is installed. The coolant enters through a pipe socket 9 at one of the bearing housings 3^1 arranged at the ends, and flows through the bearing housing, which in this case is hollow, in the direction of the arrow. The thin-walled bearing cap 3^{11} of the bearing housing 3^1 allows for an intensive cooling of the side of the bearing housing facing the surface of the strand as well as the bearing pin, and reaches the next bearing housing through the pipe conduit 6^{11} connecting the bearing housings. After flowing therethrough, the coolant reaches the following bearing housings 3 up to the last bearing housing 3^1 in the same manner as described above, which bearing housing 3^1 again is equipped with a pipe socket 9^1 having a rapidly-releasable connection 8, which is connectable to the drain conduit. In a roller according to this embodiment, all the bearing housings are secured against mutual rotation by the pipe conduits 6^{11}, and when the roller is

being inserted into the strand guide stand, only one of the bearing housings need be aligned.

In order to arrange the coolant supply and drainage at one side of the roller, it is possible to lead the coolant drain conduit from the last bearing housing back to the opposite end of the roller, to which end the coolant supply conduit is connected, the return conduit also being arranged axially parallel to the roller and penetrating the bearing housing in the manner illustrated in Fig. 1.

For rollers subjected to an especially high rate of wear, the embodiment shown in Fig. 1 can be combined with the embodiment according to Fig. 5, whereby the bearing zones of the roller are supplied with a lubricant as well as with coolant.

The bearing housings 3 and 3^1 are suitably divided into a bearing housing lower part and a bearing housing cap. When using rollers that are divided at the bearing pins perpendicular relative to the axis, the parts of which are held together by axially-located internal bracing means, it is possible to use undivided bearing housings.

For better transport of the strand as well as for ensuring that rotation of all rollers occurs during continuous casting (jamming leads to destruction of the roller) the rollers 1 can also be connected at one end with a drive, such as a slip-on hydraulic motor.

According to a further embodiment of the invention, each one of the hollow bearing housings is provided with its own coolant supply and coolant return conduits the coolant conduits of the inwardly arranged bearing housings penetrating the outer bearing housings in the manner shown in Fig. 1, whereby, again, the bearing housings are secured against relative rotation.

WHAT WE CLAIM IS:—

1. A roller assembly forming part of a continuous casting plant strand guide in a stationary supporting construction, comprising a roller supported at a plurality of bearing zones spaced along its length, and bearing housings adapted to accommodate the bearing zones which bearing housings are supported on the stationary supporting construction, and connecting means separate from the stationary supporting construction extending parallel to the axis of the roller which connecting means interconnect said bearing housings to prevent relative rotation of one housing to another about the axis of the roller.

2. A roller assembly as claimed in Claim 1, wherein the connecting means comprise pipe conduits which additionally serve for supplying a coolant.

3. A roller assembly as claimed in Claim 1, wherein the connecting means comprise pipe conduits which additionally serve for supplying a lubricant.

4. A roller assembly as claimed in Claim 1, wherein the connecting means comprise pipe conduits which additionally serve for supplying a coolant and a lubricant.

5. A roller assembly as claimed in any of Claims 2 to 4, wherein a separate pipe conduit is connected to each bearing housing and bores are provided in the bearing housings arranged outwardly along the length of said roller, the pipe conduits pertaining to the bearing housings located inwardly along the length of said roller passing through said bores.

6. A roller assembly as claimed in any of Claims 2 to 4, wherein the pipe conduits extend from one end only of said roller.

7. A roller assembly as claimed in any of Claims 2 to 4, wherein adjacent bearing housings are connected by one pipe conduit each, and at least one of the bearing housings arranged at the ends of the roller is provided with a pipe conduit leading to the outside which communicates with fluid supply means, the pipe conduits being adapted to be in communication with one another.

8. A roller assembly as claimed in any of Claim 1 to 7, wherein those pipe conduits which extend to the outside are provided with rapidly-releasable connections for connection to fluid supply means.

9. A roller assembly substantially as hereinbefore described with reference to the accompanying drawings.

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3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1

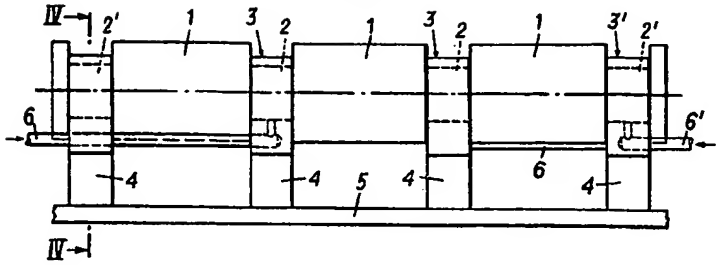

FIG.2

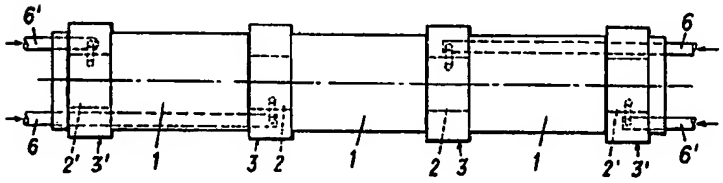

FIG.5

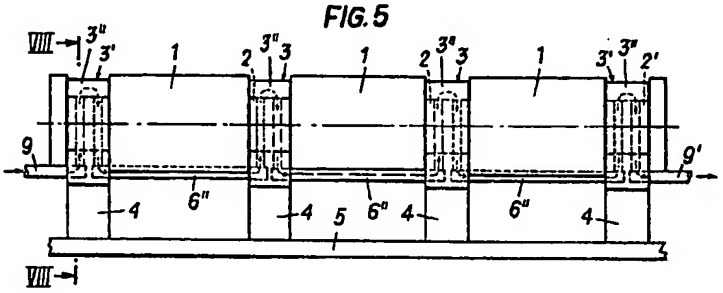

FIG.6

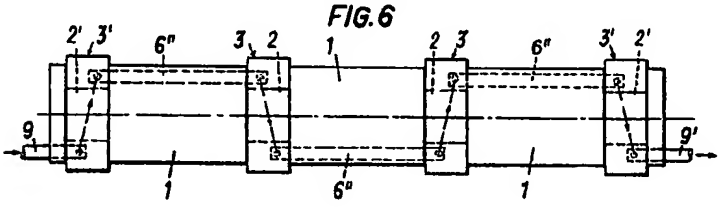

FIG.3

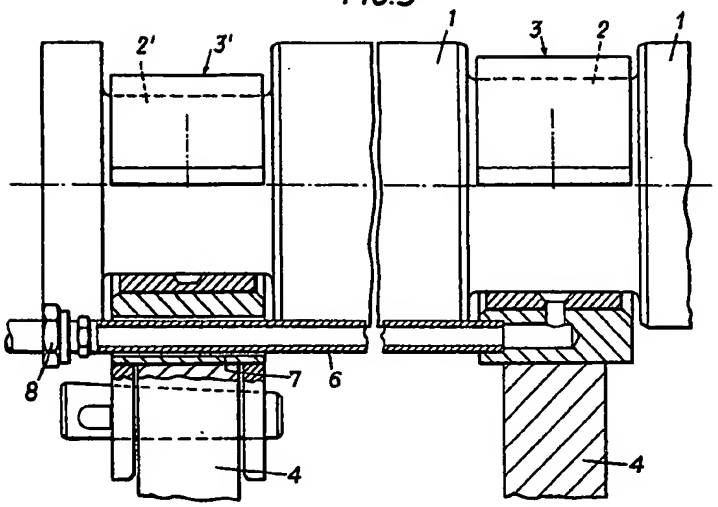

FIG.4

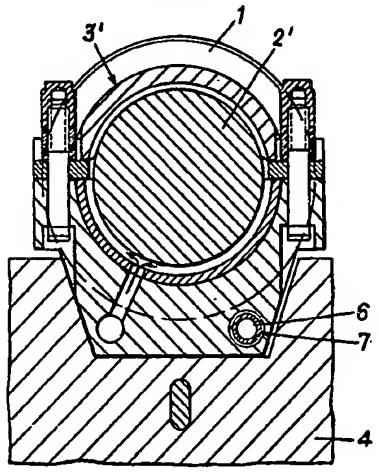

FIG.7

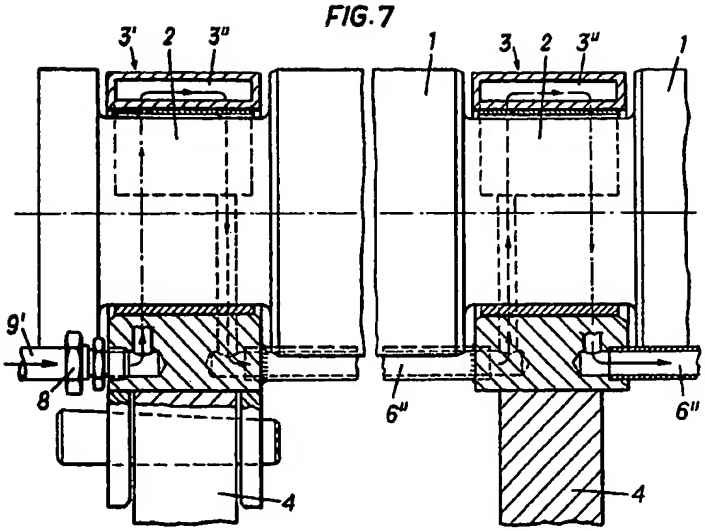

FIG.8